



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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February 23, 1993

TO: Bruce Cochran, Project Manager
Toxics Cleanup Program

FROM: Pam Marti, Hydrogeologist
Environmental Investigations & Laboratory Services

SUBJECT: Lakewood/Plaza Cleaners Long-term Monitoring Round V

Attached are your copies of the technical document which summarizes the findings of Sample Round V for Lakewood/Plaza Cleaners, conducted December 1-3, 1992. Low levels of tetrachloroethylene (PERC), trichloroethylene (TCE) and 1,2-dichloroethylene (1,2-DCE) continue to be detected in most of the wells, with the exception of MW-20B. Concentrations of PERC decreased in well MW-20B from 940 ppb in May 1992 to 340 ppb in December 1992. Although PERC concentrations decreased since the most recent soil removal from Plaza Cleaners, at this time there is insufficient data to indicate if this removal contributed to the decrease. Overall, tetrachloroethylene, trichloroethylene, and 1,2-dichloroethylene concentrations are similar to those reported in previous sample rounds.

According to the Long Term Remedial Action Plan, upgradient wells MW-19A and MW-40 were to be sampled annually for the first three years of sampling. Sample Round V completed the third year of monitoring. If you would like me to continue sampling these wells, please contact me.

I will be conducting Sample Round VI in May 1992. If you have any questions or comments, please call me at 586-8138.

PM:krc

cc: Lynn Singleton
~~Bill Yake~~
Kathy Reed, TCP Library
Bob Kievit, EPA
Tim Nord, TCP Site Cleanup Section Supervisor
Bert Bowen, Water Quality

**LAKWOOD/PLAZA CLEANERS
LONG-TERM MONITORING ROUND V
DECEMBER 1-3, 1992**

by
Pamela B. Marti

February 25, 1993

Washington State Department of Ecology
Environmental Investigations and Laboratory Services Program
Toxics, Compliance and Ground Water Investigations Section
Olympia, Washington 98504-7710

Water Body No. WA-PS-0300
(Segment No. 05-12-GW)

ABSTRACT

Routine monitoring was conducted at Lakewood/Plaza Cleaners on December 1-3, 1992 in compliance with the Record of Decision (ROD). Ground water samples were collected from ten monitoring wells. Low levels of tetrachloroethylene, trichloroethylene and 1,2-dichloroethylene continue to be detected in most of the monitoring wells, with the exception of MW-20B. Tetrachloroethylene concentrations decreased in well MW-20B from 940 ppb in May 1992 to 340 ppb in December 1992. Tetrachloroethylene concentrations are similar to those reported in previous sample rounds.

OBJECTIVES

The Toxics Cleanup Program (TCP) requested that the Toxics, Compliance and Ground Water Investigations Section conduct long-term monitoring of the ground water at the Lakewood/Plaza Cleaners Site on a semi-annual basis. Monitoring objectives are as follows:

1. Collect ground water quality data that can be used to evaluate the effectiveness of continued operation of wells H1 and H2 to contain and remove contaminated ground water from the aquifer.
2. Monitor ground water upgradient of the site annually to determine if contaminants are migrating toward H1 and H2 from McChord Air Force Base (MCAFAB).

SITE BACKGROUND

In 1981, tetrachloroethylene (PERC), trichloroethylene (TCE), and 1,2-dichloroethylene (1,2-DCE) were detected in two Lakewood Water District supply wells (wells H1 and H2), as shown on Figure 1. On-site disposal of waste solvents and sludges at Plaza Cleaners, located 800 feet north of the wells, was identified as the source of contamination. Site remediation consisted of removal of contaminated sludge and soils, soil-vapor extraction and installation of two air-stripping towers for wells H1 and H2.

Results from on-site monitoring wells between 1985 to 1990 showed that the pump and treat system had contained and reduced the level of ground water contamination (CH2M Hill, 1990a). A 1986 concentration contour map showed a portion of the contaminated plume located northwest of the site was not being captured by remedial pumping (CH2M Hill, 1988). However, contaminant concentrations in the uncaptured plume were decreasing; possibly due to biodegradation, dispersion and/or dilution. Additional soil was excavated from Plaza Cleaners in the summer of 1992.

Upgradient monitoring wells were installed to detect possible contaminant migration from the adjacent McChord Air Force Base (MCAFAB). Previous studies (EPA, 1985) indicated potential contamination sources from MCAFAB are located within the long-term capture zone of wells H1 and H2. Possible contaminants from MCAFAB include hydrocarbons, pesticides, and heavy metals. Upgradient monitoring wells MW-19A and MW-40 have been sampled annually. According to the Long Term Remedial Action Plan this is the last year these wells were to be sampled (CH2M HILL, 1990b).

Geology of the study area was defined in the Final Draft Remedial Investigation Report for Ponder's Corner, Washington (EPA, 1985) as consisting of four geologic units which are listed in order of increased depth; the Steilacoom Gravel, Vashon Till, Advance Outwash, and the Colvos Sands. The main units of interest are the Steilacoom Gravel, Vashon Till and Advance Outwash. The Steilacoom Gravel is found throughout most of the study area and ranges in thickness from 1 to 58 feet. This unit often contains perched water. At the site perched ground water flows to the northwest near wells H1 and H2, but to the south and southeast near the south end of Plaza Cleaners. The Vashon Till underlies the Steilacoom Gravel and ranges in thickness from 8 to 92 feet. Over most of the site the till (a mixture of clay, silt, sand and gravel) forms an aquitard separating the Steilacoom Gravel, above, from the Advance Outwash, below. The Advance Outwash is the primary aquifer for the area. The predominant horizontal flow in the Advance Outwash is west-northwest when production wells H1 and H2 are not in use. When in use, the wells create a large cone of depression. Previous studies showed that drawdowns occur in shallow monitoring wells drilled in the Steilacoom gravel when H1 and H2 are pumping (EPA, 1985). This indicates some hydraulic interconnection between the Steilacoom Gravel and the Advance Outwash.

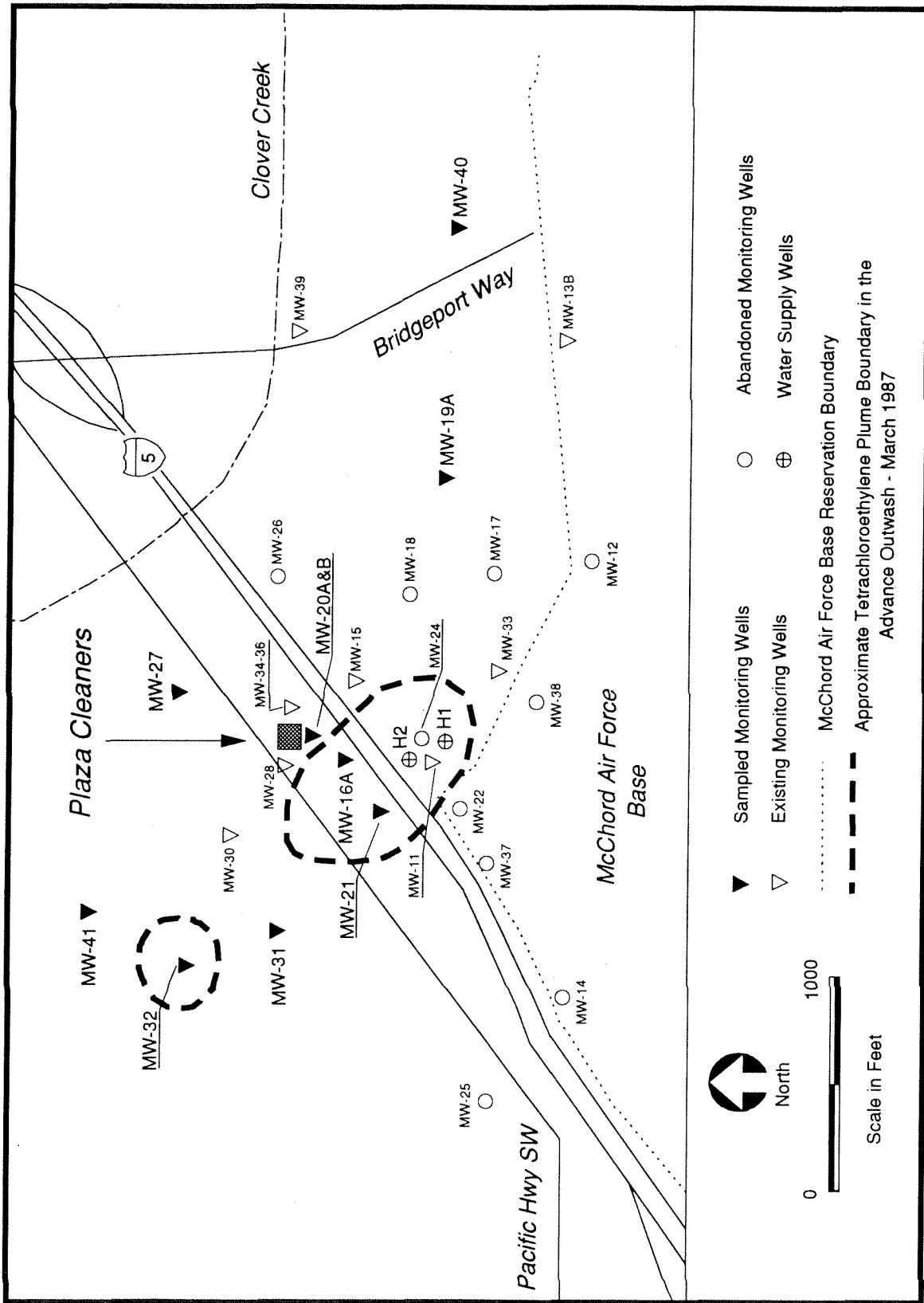


Figure 1: Well Location Map - Lakewood/Plaza Cleaners

METHODS

Ground Water Sampling

Samples were collected on December 1-3, 1992, from MW-16A, MW-19A, MW-20A, MW-20B, MW-21, MW-27, MW-31, MW-32, MW-40, and MW-41 (Figure 2). Prior to sample collection, static water level measurements were obtained using an electronic water level indicator which was rinsed with deionized water after each use. All monitoring wells were purged until a minimum of three well volumes had been removed and pH, temperature, and specific conductance readings stabilized. Purge water was discharged to storm drains or to the ground near each monitoring well. All wells but one (MW-20B) were purged and sampled using dedicated bladder pumps. Well MW-20B was purged and sampled with a decontaminated teflon bailer.

Wells were sampled from the least to most contaminated. Samples collected for volatile organics were free of headspace and preserved with two drops of 1:1 hydrochloric acid. Volatile organic samples were analyzed using EPA SW 846 Method 8240 (EPA, 1986).

The bailer was pre-cleaned with a Liquinox® wash and sequential rinses of hot tap water, 10% nitric acid, distilled/deionized water, and pesticide-grade acetone. After cleaning, the bailer was air-dried and wrapped in aluminum foil. Chain-of-custody procedures were followed in accordance with Manchester Laboratory protocol (Ecology, 1991).

Quality Assurance Samples

In general, the quality of the data is acceptable for use, although the samples were analyzed one week past the 14-day holding time. According to the quality assurance review, this should have no effect on the validity of the analysis since the volatile compounds detected have been shown to be stable for more than thirty days.

Quality control samples collected in the field consisted of transfer blank, transport blank, a blind duplicate, and a replicate sample. A transfer blank was collected by pouring organic-free water through a decontaminated bailer. A transport blank was carried unopened throughout the sampling event. A blind duplicate sample, labeled MW-16B, was collected from well MW-16A. Duplicate samples are two sets of samples collected from a well simultaneously and submitted to the laboratory with different identification. A replicate sample, labeled MW-20A**, was collected from well MW-20A. Replicate samples are two sets of samples collected from a well at different times. In addition to quality control samples collected in the field, laboratory quality assurance samples consisted of matrix spikes, matrix spike duplicates and surrogate compound recoveries.

Volatile organic analyses were performed by Manchester Laboratory. Dick Huntamer of the Manchester Laboratory conducted the quality assurance review, which has been included in Appendix A. Since the samples were analyzed past the 14-day holding time, most results are

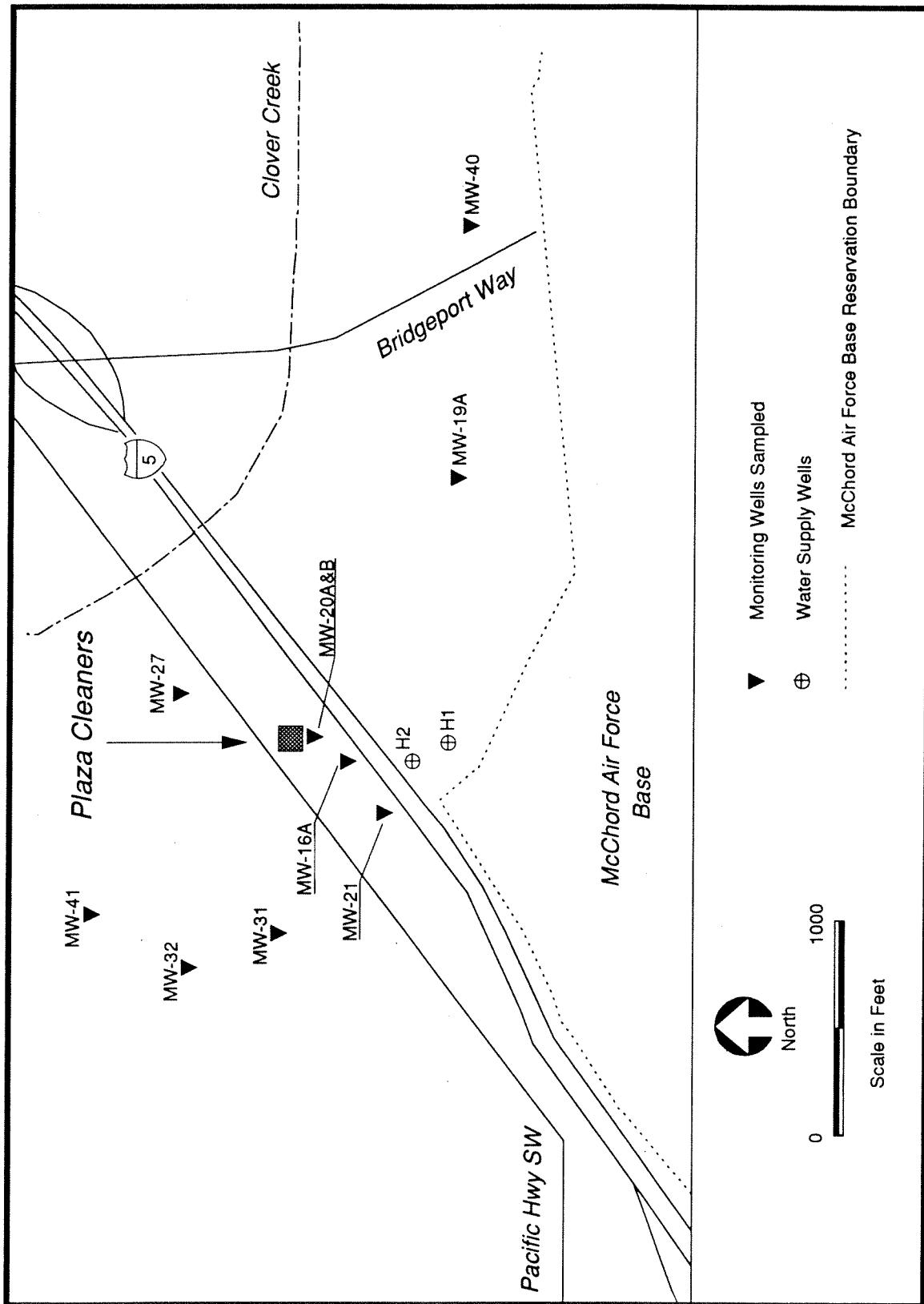


Figure 2: Lakewood/Plaza Cleaners Sample Locations for December 1992

qualified as estimates. Several volatile organics were detected in the method blanks at or below the detection limits. None of these compounds were detected in any of the field samples. Fluorobenzene was detected in all of the samples and method blanks.

Duplicate samples collected at MW-16A provide an estimate of combined sampling and laboratory precision. The numeric comparison of duplicate results is expressed as the relative percent difference or RPD. RPDs are the ratio of the difference and the mean of the duplicate results expressed as a percentage. The RPDs for tetrachloroethylene (PERC) and 1,2-dichloroethylene were 0%, and trichloroethylene (TCE) was 28%. Because these percentages are based on values near the quantitation limit, they are probably not representative of precision at higher concentrations. Matrix spike and spike duplicate recoveries for volatile organics are within the QC limits of $\pm 25\%$ for water sample analysis.

RESULTS

Field Observations

Table 1 lists field observation data including well depth, geologic unit, static water level, pH, specific conductance, temperature, and purged volume in order the wells were sampled. Depth to water ranged from 31.49 to 64.67 feet. Stabilized field measurements for pH, specific conductance and temperature ranged as follows: pH from 6.3 to 7.4 standard units, specific conductance from 134 to 750 umhos/cm and temperature from 10.0 to 12.9°C. Well MW-20A had a pH reading of 9.0 standard units, which is consistent with previous measurements. High pH readings in MW-20A are most likely related to well construction. Well MW-20B had a higher specific conductance reading (750 umhos/cm) than other wells. A higher specific conductance is expected for samples from the Vashon Till compared to samples from the Advance Outwash.

Analytical Results

Table 2 summarizes analytical results for sample Round V conducted on December 1-3, 1992. Tetrachloroethylene (PERC) and 1,2-dichloroethylene (1,2-DCE) were detected in most of the wells screened in the Advance Outwash. These compounds were detected in wells MW-16A, MW-20A, MW-21, MW-31, and MW-32 at concentrations at or near the quantitation limit. Maximum PERC (340 ppb), 1,2-DCE (20 ppb), and trichloroethylene (TCE, 14 ppb) concentrations were detected in well MW-20B, which is screened in the Vashon Till. Since the samples were analyzed past the holding time these results are qualified as estimates. Fluorobenzene was detected in all of the samples, but was not reported since it was found in the laboratory blanks.

Laboratory reporting sheets are presented in Appendix A. Data were managed using the ENVIS database software package.

Table 1: Field Parameter Results for December 1-3, 1992

Monitoring Well	Total Depth From Top of PVC Casing As Measured	Geologic Unit Screened	Depth to Water	pH (st. units)	Specific Conductance (umhos/cm)	Temperature (°C)	Purge Volume (gallons)
MW-40	75.1	Advance Outwash	36.6	7.3	230	10.0	19
MW-19A	97.5	Advance Outwash	42.8	7.1	139	10.7	27
MW-41	96.8	Advance Outwash	31.49	7.4	149	10.7	33
MW-27	96.4	Advance Outwash	++	6.9	145	11.4	20
MW-20A	97.3	Advance Outwash	37.17	9.0	154	12.0	30
MW-32	114.4	Advance Outwash	64.67	7.2	138	10.9	25
MW-31	91.5	Advance Outwash	++	7.1	134	10.9	30
MW-21	92.1	Advance Outwash	45.64	7.0	145	11.3	23
MW-16A	109	Advance Outwash	--	7.2	149	11.5	125
MW-20B	50.4	Vashon Till	40.57	6.3	750	12.9	5

++ = Dedicated pump obstructs water-level measurement.

-- = Water level probe not working.

Table 2: Summary of Analytes Detected in Samples Collected During December 1–3, 1992

Geologic Unit Screened	Vashon Till	Advance Outwash										Upgradient Wells
		MW-20B	MW-16A	MW-16B*	MW-20A	MW-20A**	MW-21	MW-27	MW-31	MW-32	MW-41	
Volatile Organics: (ug/L)												
Tetrachloroethylene (PERC)	340 J	9	9 J	0.8 J	0.3 J	2	1 UJ	0.5 J	0.7 J	1 UJ	1 UJ	1 UJ
Trichloroethylene (TCE)	14 J	0.3 J	0.4 J	1 UJ	1 UJ	0.2 J	1 UJ					
1,2-Dichloroethylene (1,2-DCE)	20 J	0.8 J	0.8 J	1 UJ	1 UJ	0.3 J	1 UJ	0.9 J	0.5 J	1 UJ	1 UJ	1 UJ

* = Duplicate

** = Replicate

J = The analyte was positively identified. The associated numerical result is an estimate.

UJ = The analyte was not detected at or above the reported estimated result.

DISCUSSION AND CONCLUSIONS

Table 3 shows PERC, TCE, and 1,2-DCE concentrations for January 1991 through December 1992. Well MW-20B continues to have the highest concentrations of any of the wells sampled. Historical maximum concentrations for PERC and TCE recorded in well MW-20B occurred in March 1985 at 4,856 ppb and 103 ppb respectively. Well MW-20B is close to Plaza Cleaners, and is screened in the Vashon Till. PERC and TCE concentrations measured at the Lakewood site over the history of the project are presented in Appendix B. During this sample round concentrations of PERC, TCE and 1,2-DCE in MW-20B were 340 ppb, 14 ppb, and 20 ppb respectively. PERC concentration decreased substantially from the May 1992 measurement of 940 ppb. Although PERC concentrations decreased since the most recent soil removal (August, 1992), at this time there is insufficient data to indicate if this is a contributing factor. PERC concentrations measured previously have been as low as 120 ppb in November 1991.

Low concentrations of PERC, TCE and 1,2-DCE were also detected in MW-16A with concentrations of 9 ppb, 0.3 ppb, and 0.8 ppb respectively. Concentrations in MW-16A continue to be higher in this well than those measured in MW-20A. Both wells are screened in the Advance Outwash below the contaminated Vashon Till, however, MW-16A is further from the source (See Figure 2). Higher contaminant concentrations in MW-16A are evidence that more permeable materials (lenses) in the overlying contaminated Vashon Till may be allowing downward migration of contaminants to the Advance Outwash.

Upgradient monitoring wells MW-19A and MW-40 were sampled to assess the quality of ground water upgradient of the site. No contaminants were detected. According to the Long Term Remedial Action Plan this was the last year wells MW-19A and MW-40 were to be sampled (CH2M HILL, 1990b).

Table 3: Summary of Sampling Results from January 1991 to December 1992

Well Number	January 1991				May 1991				November 1991				May 1992				December 1992				
	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE	PERC	TCE	1,2-DCE
MW-16A	28	1 J	2.4 J	28	0.6 J	2	27	J	1.0 U	0.6 J	7	1.0 U	1	8 J	0.3 J	0.8 J	4	8 J	0.3 J	0.8 J	4
MW-20A	1.0 U	1.0 U	1.0 U	0.4 J	1.0 U	1.0 U	0.4 J	1.0 U	1.0 U	0.5 J	1.0 U	1.0 U	0.8 J	1 UJ	1 UJ	1 UJ	0.8 J	1 UJ	1 UJ	1 UJ	
MW-20B	180 D	18	33	752	16	30	120	28 J	67	940	13	32	340 J	14 J	20 J	340 J	14 J	20 J	340 J	14 J	20 J
MW-21	21 J	1.0 U	1 J	2	1.0 U	0.7 J	22 J	3	1.0 U	1.0 J	2	1.0 U	0.8 J	2	0.2 J	0.3 J	0.3 J	0.2 J	0.3 J	0.3 J	
MW-27	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 UJ	1 UJ	1 UJ								
MW-31	1 J	1.0 U	0.8 J	0.6 J	1.0 U	2	0.9 J	1.0 U	2.2 J	0.8 J	1.0 U	1	0.5 J	1 UJ	0.9 J	1 UJ	0.9 J	1 UJ	0.9 J	1 UJ	0.9 J
MW-32	1 J	1.0 U	1.1 J	1	1.0 U	2	0.6 J	1.0 U	0.6 J	0.7 J	1.0 U	1	0.7 J	1 UJ	0.7 J	1 UJ	0.7 J	1 UJ	0.7 J	1 UJ	0.7 J
MW-41	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 UJ	1 UJ	1 UJ								
MW-19A	--	--	--	--	--	--	--	--	--	0.5 J	1.0 U	--	--	--	--	--	--	--	1 UJ	1 UJ	1 UJ
MW-40	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	1 UJ	1 UJ	1 UJ

U = The analyte was not detected at or above the reported result.

J = The analyte was positively identified. The associated numerical result is an estimate.

UJ = The analyte was not detected at or above the reported estimated result.

D = Analysis performed at secondary dilution.

-- = Not Tested

REFERENCES

- CH2M HILL, 1988. Final Aquifer Cleanup Assessment Report. Ponders Corner, Washington.
- CH2M HILL, 1990a. Sampling and Analysis Plan Remedial Action - Lakewood RA.
- CH2M HILL, 1990b. Technical Memorandum from Lisa Dally Wilson to Ann Williamson, RE: Groundwater Sampling at Lakewood (April 1990). Project No. SEA69018RA.FQ.
- Washington State Department of Ecology, 1991. Manchester Environmental Laboratory - Laboratory Users Manual. Edited by D. Huntamer and J. Hyre.
- U.S. Environmental Protection Agency, 1983. Methods for Chemical Analysis of Water and Wastes. Environmental Monitoring and Support Laboratory Cincinnati, Ohio, EPA 600/4-79-020.
- U.S. Environmental Protection Agency, 1985. Final Draft Remedial Investigation Report - Ponder's Corner, Washington. EPA 112-0L22.
- U.S. Environmental Protection Agency, 1986. Test Methods for Evaluating Solid Waste, SW-846. Office of Emergency Response, Washington D.C.

APPENDIX A

Analytical Results
Lakewood/Plaza Cleaners
December 1–3, 1992

MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Drive E , Port Orchard Washington 98366

CASE NARRATIVE

February 11, 1993

Subject: Lakewood/Plaza Cleaners
Samples: 92 - 498080 to -498093
Case No. DOE-553Y
Officer: Pam Marti
By: Dickey D. Huntamer *EH*
Organics Analysis Unit

VOLATILE ORGANIC ANALYSIS

ANALYTICAL METHODS:

Volatile organic compounds were analyzed using Manchester modification of the EPA SW 846 Method 8240 purge-trap procedure with capillary GC/MS analysis. Normal QA/QC procedures were performed on the samples.

BLANKS:

Low levels of the common laboratory solvents acetone, methylene chloride were detected in the laboratory blanks. The EPA five times rule was applied to all target compounds which were found in the blank. Compounds that were found in the sample and in the blank were considered real and not the result of contamination if the levels in the sample are greater than or equal to five times the amount of compounds in the associated method blank.

SURROGATES:

Surrogate recoveries were within acceptable limits for all of the recommended surrogate compounds. One surrogate, p-bromofluorobenzene in the lab blank ABW2356 was 1% below the limit. Since the other surrogates were acceptable no qualifiers were added to the sample data due to the one surrogate being low.

HOLDING TIMES:

A clerical error was made when preparing the VOA shoot log. The collection date for the samples was listed as February 8, 1992 instead of February 1, 1992. This resulted in the samples exceeding holding times by five to seven days. This should have no effect on the validity of the analysis since those volatile compounds detected have been shown to be stable for more than thirty days. However, following EPA guidelines the "J" data qualifier was added to all of the analytical results since the recommended fourteen day holding times were exceeded.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE:

Matrix spikes recoveries were acceptable and Relative Percent Differences (RPD) for all compounds except cis-1,2-dichloroethene and 2,2-dichloropropane. Results for those compounds in the matrix spike sample -498083 were qualified with a "J".

SPECIAL ANALYTICAL PROBLEMS:

Other than the problem with holding times no other analytical problems were encountered. The data is acceptable for use as qualified..

DATA QUALIFIER CODES:

- U - The analyte was not detected at or above the reported value.
- J - The analyte was positively identified. The associated numerical value is an estimate.
- UJ - The analyte was not detected at or above the reported estimated result.
- REJ - The data are unusable for all purposes.
- EXP - The result is equal to the number before EXP times 10 to the power of the number after EXP. As an example 3EXP6 equals 3×10^6 .
- NAF - Not analyzed for.
- N - For organic analytes there is evidence the analyte is present in this sample.
- NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.
- E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.
- * - The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: MANCHESTER LAB Contract: _____
Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____
Lab File ID: ABW2356 Lab Sample ID: BLANK
Date Analyzed: 12/21/92 Time Analyzed: 1505
Matrix: (soil/water) WATER Level: (low/med) _____
Instrument ID: 5100

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01 ABW2356	BLANK	ABW2356	1505
02 A92498080	SAMPLE	A498080	1639
03 A92498081	SAMPLE	A498081	1720
04 A92498082	SAMPLE	A498082	1758
05 A92498083	SAMPLE	A498083	1833
06 A92498084	SAMPLE	A498084	1909
07 A92498085	SAMPLE	A498085	1944

COMMENTS: ABS2356 - 5ML BLANK - 12/21/92
DB-624, 30M, 0.32MM, 1.8U, 10C FOR 2MIN, 10-102/8C, 102-180/20C & HOL

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: MANCHESTER LAB Contract: _____
Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____
Lab File ID: ABW2357 Lab Sample ID: BLANK
Date Analyzed: 12/22/92 Time Analyzed: 1217
Matrix: (soil/water) WATER Level: (low/med) _____
Instrument ID: 5100

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01 A92498086	SAMPLE	A498086	1258
02 A92498087	SAMPLE	A498087	1332
03 A92498088	SAMPLE	A498088	1407
04 A92498089	SAMPLE	A498089	1439
05 A92498090	SAMPLE	A498090	1516
06 A92498091	SAMPLE	A498091	1549
07 ABW2357	BLANK	ABW2357	1217

COMMENTS: ABW2357 - 5MLS - BLANK - 12/22/92
DB-624, 30M, 0.32MM, 1.8U, 10C FOR 2MIN, 10-102/8C, 102-180/20C & HOL

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: MANCHESTER LAB

Contract: _____

Lab Code: _____

Case No.: _____

SAS No.: _____

SDG No.: _____

Lab File ID: ABW2358

Lab Sample ID: BLANK

Date Analyzed: 12/23/92

Time Analyzed: 1219

Matrix: (soil/water) WATER

Level: (low/med) _____

Instrument ID: 5100

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01 A92498087Y	MATRIX SPIKE	A498087Y	1405
02 A92498087Z	SPIKE DUP	A498087Z	1443
03 A92498090A	DILUTION	A498090A	1523
04 A92498092	SAMPLE	A498092	1257
05 A92498093	SAMPLE	A498093	1329
06 ABW2358	BLANK	ABW2358	1219

COMMENTS: AVW2358 - 100NG STD - DAILY CALIBRATION - 12/23/92
DB-624, 30M, 0.32MM, 1.8U, 10C FOR 2MIN, 10-102/8C, 102-180/20C & HOL

Project: DOE-553Y LAKEWOOD/PLAZZA CLEANERS

Officer: PZM Account: D3P11

Laboratory: Ecology, Manchester

Sample No: 92 498080 Description: MW-40

Begin Date: 9/2/12/01 :

	VOA - PP Scan (GCMS)	Water-Total Result Units	PP Scan (GCMS) *** Continued	Water-Total Result *** Units
Carbon Tetrachloride	1UJ ug/1			1UJ ug/1
Acetone	8UJ ug/1			1UJ ug/1
Chloroform	1UJ ug/1			1UJ ug/1
Benzene	1UJ ug/1			1UJ ug/1
1,1,1-Trichloroethane	1UJ ug/1			1UJ ug/1
Bromomethane	1UJ ug/1			1UJ ug/1
Bromochloromethane	1UJ ug/1			1UJ ug/1
Chloroethane	1UJ ug/1			1UJ ug/1
Chloromethane	1UJ ug/1			1UJ ug/1
Dibromomethane	1UJ ug/1			1UJ ug/1
Bromodichloromethane	1UJ ug/1			1UJ ug/1
Vinyl Chloride	1UJ ug/1			1UJ ug/1
Methylene Chloride	5UJ ug/1			96 * ug/1
Carbon Disulfide	5UJ ug/1			1UJ ug/1
Bromoform	1UJ ug/1			1UJ ug/1
Bromodichloromethane	1UJ ug/1			1UJ ug/1
1,1-Dichloroethane	1UJ ug/1			1UJ ug/1
1,1-Dichloroethene	1UJ ug/1			1UJ ug/1
Trichlorofluoromethane	1UJ ug/1			1UJ ug/1
Methane, Dichlorodiflu-	5UJ ug/1			1UJ ug/1
1,2-Dichloropropane	1UJ ug/1			1UJ ug/1
2-Butanone	2UJ ug/1			88 t Recov
1,1,2-Trichloroethane	1UJ ug/1			110 t Recov
Ethene, trichloro-	1UJ ug/1			107 t Recov
ETHANE, 1,1,2,2-TETRAC+	1UJ ug/1			111 t Recov
1,2,3-Trichlorobenzene	1UJ ug/1			
Hexachlorobutadiene	1UJ ug/1			
Naphthalene	1UJ ug/1			
2-Chlorotoluene	1UJ ug/1			
1,2-Dichlorobenzene	1UJ ug/1			
1,2,4-Trimethylbenzene	1UJ ug/1			
1,2-Dibromo-3-chloropr+	5UJ ug/1			
1,2,3-Trichloropropane	1UJ ug/1			
Tert-Butylbenzene	1UJ ug/1			
Isopropylbenzene (Cume+)	1UJ ug/1			
p-Isopropyltoluene	1UJ ug/1			
Ethylbenzene	1UJ ug/1			
BENZENE, ETHENYL- (STYR+)	1UJ ug/1			
BENZENE, PROPYL-	1UJ ug/1			
Butylbenzene	1UJ ug/1			
4-Chlorotoluene	1UJ ug/1			
1,4-Dichlorobenzene (EDB)	1UJ ug/1			
1,2-Dibromoethane	1UJ ug/1			
1,2-Dichloroethane	1UJ ug/1			
4-Methyl-2-Pentanone (M+	1UJ ug/1			
1,3,5-Trimethylbenzene	1UJ ug/1			

(Sample Complete)

Source: Well (Test/Observation)

Project : DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 498081 Description: MW-19

Begin Date: 92/12/01

	VOA - PP Scan (GCMS)	Water-Totals	VOA - PP Scan (GCMS)	Water-Totals	*** Continued ***	Result Units
		Result Units				
Carbon Tetrachloride	1UJ	ug/1	Bromobenzene	1UJ	ug/1	
Acetone	5UJ	ug/1	Toluene	1UJ	ug/1	
Chloroform	1UJ	ug/1	Chlorobenzene	1UJ	ug/1	
Benzene	1UJ	ug/1	1,2,4-Trichlorobenzene	1UJ	ug/1	
Bromomethane	1UJ	ug/1	Dibromo-chloromethane	1UJ	ug/1	
Chloromethane	1UJ	ug/1	Tetrachloroethene	1UJ	ug/1	
Dibromomethane	1UJ	ug/1	Sec-Butylbenzene	1UJ	ug/1	
Bromo-chloromethane	1UJ	ug/1	1,3-Dichloropropane	1UJ	ug/1	
Chloroethane	1UJ	ug/1	Cis-1,2-Dichloroethene	1UJ	ug/1	
Vinyl Chloride	1UJ	ug/1	trans-1,2-Dichloroethene+	1UJ	ug/1	
Methylene Chloride	5UJ	ug/1	Fluorobenzene	95 *	ug/1	
Carbon Disulfide	5UJ	ug/1	1,3-Dichlorobenzene	1UJ	ug/1	
Bromoform	1UJ	ug/1	1,1-Dichloropropene	1UJ	ug/1	
Bromodichloromethane	1UJ	ug/1	2-Hexanone	1UJ	ug/1	
1,1-Dichloroethane	1UJ	ug/1	2,2-Dichloropropane	1UJ	ug/1	
1,1-Dichloroethene	1UJ	ug/1	Ethane,	1,1,1,2-Tetrachloroethane	1UJ	ug/1
Trichlorofluoromethane	1UJ	ug/1	Total Xylenes	1UJ	ug/1	
Methane, Dichlorodifluoromethane	5UJ	ug/1	cis-1,3-Dichloropropene	1UJ	ug/1	
1,2-Dichloropropane	1UJ	ug/1	trans-1,3-Dichloropropene	1UJ	ug/1	
2-Butanone	1UJ	ug/1	p-Bromofluorobenzene	90	ug/1	Recov
1,1,2-Trichloroethane	1UJ	ug/1	D4-1,2-Dichlorobenzene	112	ug/1	Recov
Ethene, trichloro-	1UJ	ug/1	d8-Toluene	104	ug/1	Recov
ETHANE, 1,1,2,2-TETRACHLOROETHANE	1UJ	ug/1	d4-1,2-Dichloroethane	112	ug/1	Recov
1,2,3-Trichlorobenzene	1UJ	ug/1				
Hexachlorobutadiene	1UJ	ug/1				
Naphthalene	1UJ	ug/1				
2-Chlorotoluene	1UJ	ug/1				
1,2,4-Trimethylbenzene	1UJ	ug/1				
1,2-Dibromo-3-chloropropane	5UJ	ug/1				
1,2,3-Trichloropropane	1UJ	ug/1				
Tert-Butylbenzene	1UJ	ug/1				
Isopropylbenzene (Cumene)	1UJ	ug/1				
p-Isopropyltoluene	1UJ	ug/1				
Ethylbenzene	1UJ	ug/1				
BENZENE, ETHENYL-(STYR+)	1UJ	ug/1				
BENZENE, PROPYL-	1UJ	ug/1				
Butylbenzene	1UJ	ug/1				
4-Chlorotoluene	1UJ	ug/1				
1,4-Dichlorobenzene	1UJ	ug/1				
1,2-Dibromoethane (EDB)	1UJ	ug/1				
1,2-Dichloroethane	1UJ	ug/1				
4-Methyl-2-Pentanone (M+	1UJ	ug/1				
1,3,5-Trimethylbenzene	1UJ	ug/1				

Source: Well (Test/Observation)

Officer: PZM Account: D3P11

(sample complete)

Project : DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 498082 Description: MW-41

Begin Date: 92/12/01 :

	VOA - PP Scan (GCMS)	Water Total	VOA - PP Scan (GCMS)	Water Total
	Result Units	Result Units	*** Continued ***	Result Units
Carbon Tetrachloride	1UJ ug/1		Bromobenzene	1UJ ug/1
Acetone	4UJ ug/1		Toluene	1UJ ug/1
Chloroform	1UJ ug/1		Chlorobenzene	1UJ ug/1
Benzene	1UJ ug/1		1,2,4-Trichlorobenzeno	1UJ ug/1
1,1,1-Trichloroethane	1UJ ug/1		Dibromochloromethane	1UJ ug/1
Bromomethane	1UJ ug/1		Tetrachloroethene	1UJ ug/1
Chloromethane	1UJ ug/1		Sec-Butylbenzene	1UJ ug/1
Dibromomethane	1UJ ug/1		1,3-Dichloropropane	1UJ ug/1
Bromoform	1UJ ug/1		Cis-1,2-Dichloroethene	1UJ ug/1
Chloroethane	1UJ ug/1		trans-1,2-Dichloroethene	1UJ ug/1
Vinyl Chloride	1UJ ug/1		Fluorobenzene	95 ug/1
Methylene Chloride	5UJ ug/1		1,3-Dichlorobenzene	1UJ ug/1
Carbon Disulfide	1UJ ug/1		1,1-Dichloropropene	1UJ ug/1
Bromoform	1UJ ug/1		2-Hexanone	1UJ ug/1
Bromodichloromethane	1UJ ug/1		2,2-Dichloropropane	1UJ ug/1
1,1-Dichloroethane	1UJ ug/1		Ethane, 1,1,1,2-Tetra-	1UJ ug/1
1,1-Dichloroethene	1UJ ug/1		Total Xylenes	1UJ ug/1
Trichlorofluoromethane	1UJ ug/1		cis-1,3-Dichloropropene	1UJ ug/1
Methane, Dichlorodiflu-	5UJ ug/1		trans-1,3-Dichloroprop-	1UJ ug/1
1,2-Dichloropropane	1UJ ug/1		p-Bromofluorobenzene	91 % Recov
2-Butanone	3UJ ug/1		D4-1,2-Dichlorobenzene	109 % Recov
1,1,2-Trichloroethane	1UJ ug/1		d8-Toluene	104 % Recov
Ethene, trichloro-	1UJ ug/1		d4-1,2-Dichloroethane	109 % Recov
ETHANE, 1,1,2,2-TETRAC+	1UJ ug/1			
1,2,3-Trichlorobenzene	1UJ ug/1			
Hexachlorobutadiene	1UJ ug/1			
Naphthalene	1UJ ug/1			
2-Chlorotoluene	1UJ ug/1			
1,2-Dichlorobenzene	1UJ ug/1			
1,2,4-Trimethylbenzene	1UJ ug/1			
1,2-Dibromo-3-chloropro-	5UJ ug/1			
1,2,3-Trichloropropane	1UJ ug/1			
Tert-Butylbenzene	1UJ ug/1			
Isopropylbenzene (Cum+	1UJ ug/1			
p-Isopropyltoluene	1UJ ug/1			
Ethylbenzene	1UJ ug/1			
BENZENE, ETHENYL-(STYR+	1UJ ug/1			
BENZENE, PROPYL-	1UJ ug/1			
Butylbenzene	1UJ ug/1			
4-Chlorotoluene	1UJ ug/1			
1,4-Dichlorobenzene	1UJ ug/1			
1,2-Dibromocethane (EDB)	1UJ ug/1			
1,2-Dichloroethane	1UJ ug/1			
4-Methyl-2-Pentanone (M+	1UJ ug/1			
1,3,5-Trimethylbenzene	1UJ ug/1			

Source: Well (Test/Observation)

Officer: PZM

Account: D3P11

(Sample Complete)

Project: DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No.: 92 498083

Description: MW-27

Begin Date: 92/12/01

	VOA - PP Scan (GCMS)	Water-Total Result	Units	VOA - PP Scan (GCMS) Result	Water-Total Result	Units
Carbon Tetrachloride	1UJ	ug/1		+ Bromobenzene	1UJ	ug/1
Acetone	4UJ	ug/1		Toluene	1UJ	ug/1
Chloroform	1UJ	ug/1		Chlorobenzene	1UJ	ug/1
Benzene	1UJ	ug/1		1,2,4-Trichlorobenzene	1UJ	ug/1
1,1,1-Trichloroethane	1UJ	ug/1		Dibromochloromethane	1UJ	ug/1
Bromomethane	1UJ	ug/1		Tetrachloroethene	1UJ	ug/1
Chloromethane	1UJ	ug/1		Sec-Butylbenzene	1UJ	ug/1
Dibromomethane	1UJ	ug/1		1,3-Dichloropropane	1UJ	ug/1
Bromoform	1UJ	ug/1		Cis-1,2-Dichloroethene	1UJ	ug/1
Bromodichloromethane	1UJ	ug/1		trans-1,2-Dichloroethene+	1UJ	ug/1
Chloretane	1UJ	ug/1		Fluorobenzene	94 *	ug/1
Vinyl Chloride	1UJ	ug/1		1,3-Dichlorobenzene	1UJ	ug/1
Methylene Chloride	5UJ	ug/1		1,1-Dichloropropene	1UJ	ug/1
Carbon Disulfide	1UJ	ug/1		2-Hexanone	1UJ	ug/1
Bromoform	1UJ	ug/1		2,2-Dichloropropane	1UJ	ug/1
Trichlorofluoromethane	1UJ	ug/1		Ethane, 1,1,2-Tetrac+	1UJ	ug/1
Methane, Dichlorodiflu+	5UJ	ug/1		Total Xylenes	1UJ	ug/1
1,2-Dichloropropane	1UJ	ug/1		cis-1,3-Dichloropropene	1UJ	ug/1
2-Butanone	1UJ	ug/1		trans-1,3-Dichloroprop+	1UJ	ug/1
1,1,2-Trichloroethane	1UJ	ug/1		P-Bromofluorobenzene	91	% Recov
Ethene, trichloro-	1UJ	ug/1		D4-1,2-Dichlorobenzene	111	% Recov
ETHANE, 1,1,2,2-TETRAC+	1UJ	ug/1		d8-Toluene	105	% Recov
1,2,3-Trichlorobenzene	1UJ	ug/1		d4-1,2-Dichloroethane	109	% Recov
Naphthalene	1UJ	ug/1				
2-Chlorotoluene	1UJ	ug/1				
1,2-Dichlorobenzene	1UJ	ug/1				
1,2,4-Trimethylbenzene	1UJ	ug/1				
1,2-Dibromo-3-chloropro+	5UJ	ug/1				
1,2,3-Trichloropropane	1UJ	ug/1				
Tert-Butylbenzene	1UJ	ug/1				
Isopropylbenzene (Cume+ p-Isopropyltoluene	1UJ	ug/1				
Ethybenzene	1UJ	ug/1				
BENZENE, ETHENYL- (STYR+ BENZENE, PROPYL- Butylbenzene	1UJ	ug/1				
4-Chlorotoluene	1UJ	ug/1				
1,4-Dichlorobenzene	1UJ	ug/1				
1,2-Dibromoethane (EDB)	1UJ	ug/1				
1,2-Dichloroethane	1UJ	ug/1				
4-Methyl-2-Pentanone (M+ 1,3,5-Trimethylbenzene	1UJ	ug/1				

Source: Well (Test/Observation)

Officer: PZM

Account: D3P11

(Sample Complete)

Project: DOE-553Y LAKEWOOD/PLAZA CLEANERS

Officer: PZM Account: D3P11

Laboratory: Ecology, Manchester

Sample No: 92 498084

Description: MW-20A

Begin Date: 92/12/02 :

	VOA - PP Scan (GCMS)	Water-Total	VOA - PP Scan (GCMS)	Water-Total
	Result	Units	Result	Units
Carbon Tetrachloride	1UJ	ug/l	1UJ	ug/l
Acetone	5UJ	ug/l	Bromobenzene	1UJ ug/l
Chloroform	1UJ	ug/l	Toluene	1UJ ug/l
Benzene	1UJ	ug/l	Chlorobenzene	1UJ ug/l
1,1,1-Trichloroethane	1UJ	ug/l	1,2,4-Trichlorobenzene	1UJ ug/l
Bromomethane	1UJ	ug/l	Dibromo-chloromethane	1UJ ug/l
Chloroform	1UJ	ug/l	Tetrachloroethene	0.8J* ug/l
Bromo-chloromethane	1UJ	ug/l	Sec-Butylbenzene	1UJ ug/l
Chloroethane	1UJ	ug/l	1,3-Dichloropropane	1UJ ug/l
Vinyl Chloride	1UJ	ug/l	Cis-1,2-Dichloroethene	1UJ ug/l
Methylene Chloride	5UJ	ug/l	trans-1,2-Dichloroethene+	1UJ ug/l
Carbon Disulfide	5UJ	ug/l	Fluorobenzene	94 * ug/l
Bromoform	1UJ	ug/l	1,3-Dichlorobenzene	1UJ ug/l
Bromodichloromethane	1UJ	ug/l	1,1-Dichloropropene	1UJ ug/l
1,1-Dichloroethane	1UJ	ug/l	2-Hexanone	1UJ ug/l
1,1-Dichloroethene	1UJ	ug/l	2,2-Dichloropropane	1UJ ug/l
Trichlorofluoromethane	1UJ	ug/l	Ethane, 1,1,1,2-Tetrac+	1UJ ug/l
Methane, Dichlorodiflu-	5UJ	ug/l	Total Xylenes	1UJ ug/l
1,2-Dichloropropane	1UJ	ug/l	cis-1,3-Dichloropropene	1UJ ug/l
2-Butanone	5UJ	ug/l	trans-1,3-Dichloropropene	1UJ ug/l
1,1,2-Trichloroethane	1UJ	ug/l	p-Bromofluorobenzene	86 # Recov
Ethene, trichloro-	1UJ	ug/l	D4-1,2-Dichlorobenzene	110 # Recov
ETHANE, 1,1,2,2-TETRAC+	1UJ	ug/l	d8-Toluene	101 # Recov
1,2,3-Trichlorobenzene	1UJ	ug/l	d4-1,2-Dichloroethane	109 # Recov
Hexachlorobutadiene	1UJ	ug/l		
Naphthalene	1UJ	ug/l		
2-Chlorotoluene	1UJ	ug/l		
1,2-Dichlorobenzene	1UJ	ug/l		
1,2,4-Trimethylbenzene	1UJ	ug/l		
1,2-Dibromo-3-chloropro-	5UJ	ug/l		
1,2,3-Trichloropropane	1UJ	ug/l		
Tert-Butylbenzene	1UJ	ug/l		
Isopropylbenzene (Cum+	1UJ	ug/l		
p-Isopropyltoluene	1UJ	ug/l		
Ethylibenzene	1UJ	ug/l		
BENZENE, ETHENYL-(STYR+	1UJ	ug/l		
BENZENE, PROPYL-	1UJ	ug/l		
Butylbenzene	1UJ	ug/l		
4-Chlorotoluene	1UJ	ug/l		
1,4-Dichlorobenzene	1UJ	ug/l		
1,2-Dibromoethane (EDB)	1UJ	ug/l		
1,2-Dichloroethane	1UJ	ug/l		
4-Methyl-2-Pentanone (M+	1UJ	ug/l		
1,3,5-Trimethylbenzene	1UJ	ug/l		

(Sample Complete)

Source: Well (Test/Observation)

Project: DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Officer: PZM Account: D3P11

Sample No: 92 498085 Description: MW-32

Begin Date: 92/12/02

	VOA - PP Scan (GCMS)	Water-Totals	VOA - PP Scan (GCMS)	Water-Totals	Result	Units
		Result	*** Continued ***	Result	Units	
Carbon Tetrachloride	1UJ ug/1	Bromobenzene	1UJ ug/1	1UJ ug/1	ug/1	
Acetone	5UJ ug/1	Toluene	1UJ ug/1	1UJ ug/1	ug/1	
Chloroform	1UJ ug/1	Chlorobenzene	1UJ ug/1	1UJ ug/1	ug/1	
Benzene	1UJ ug/1	1,2,4-Trichlorobenzene	1UJ ug/1	1UJ ug/1	ug/1	
1,1,1-Trichloroethane	1UJ ug/1	Dibromo-chloromethane	1UJ ug/1	1UJ ug/1	ug/1	
Bromomethane	1UJ ug/1	Tetrachloroethene	0.7J* ug/1	0.7J* ug/1	ug/1	
Dibromomethane	1UJ ug/1	Sec-Butylbenzene	1UJ ug/1	1UJ ug/1	ug/1	
Bromo-chloromethane	1UJ ug/1	1,3-Dichloropropane	1UJ ug/1	1UJ ug/1	ug/1	
Chloroethane	1UJ ug/1	Cis-1,2-Dichloroethene	0.5J* ug/1	0.5J* ug/1	ug/1	
Vinyl Chloride	1UJ ug/1	trans-1,2-Dichloroethene	1UJ ug/1	1UJ ug/1	ug/1	
Methylene Chloride	5UJ ug/1	Fluorobenzene	9.4 ug/1	9.4 ug/1	ug/1	
Carbon Disulfide	5UJ ug/1	1,3-Dichlorobenzene	1UJ ug/1	1UJ ug/1	ug/1	
Bromoform	1UJ ug/1	1,1-Dichloropropane	1UJ ug/1	1UJ ug/1	ug/1	
Bromodichloromethane	1UJ ug/1	2-Hexanone	1UJ ug/1	1UJ ug/1	ug/1	
1,1-Dichloroethane	1UJ ug/1	2,2-Dichloropropane	1UJ ug/1	1UJ ug/1	ug/1	
1,1,1-Trichloroethene	5UJ ug/1	Ethane, 1,1,1,2-Tetrac+	1UJ ug/1	1UJ ug/1	ug/1	
Trichlorofluoromethane	1UJ ug/1	Total Xylenes	1UJ ug/1	1UJ ug/1	ug/1	
Methane, Dichlorodiflu+	5UJ ug/1	cis-1,3-Dichloropropene	1UJ ug/1	1UJ ug/1	ug/1	
1,2-Dichloropropane	1UJ ug/1	trans-1,3-Dichloroprop+	1UJ ug/1	1UJ ug/1	ug/1	
2-Butanone	5UJ ug/1	p-Bromofluorobenzene	90 ug/1	90 ug/1	ug/1	
1,1,2-Trichloroethane	1UJ ug/1	D4-1,2-Dichlorobenzene	11.3 ug/1	11.3 ug/1	ug/1	
Ethene, trichloro-	1UJ ug/1	d8-Toluene	10.4 ug/1	10.4 ug/1	ug/1	
ETHANE, 1,1,2,2-TETRAC+	1UJ ug/1	d4-1,2-Dichloroethane	110 ug/1	110 ug/1	ug/1	
1,2,3-Trichlorobenzene	1UJ ug/1					
Hexachlorobutadiene	1UJ ug/1					
Naphthalene	1UJ ug/1					
2-Chlorotoluene	1UJ ug/1					
1,2-Dichlorobenzene	1UJ ug/1					
1,2,4-Trimethylbenzene	1UJ ug/1					
1,2-Dibromo-3-chloropr+	5UJ ug/1					
1,2,3-Trichloropropane	1UJ ug/1					
Tert-Butylbenzene	1UJ ug/1					
Isopropylbenzene (Cum+)	1UJ ug/1					
p-Isopropyltoluene	1UJ ug/1					
Ethylbenzene	1UJ ug/1					
BENZENE, ETHENYL-(STYR+	1UJ ug/1					
BENZENE, PROPYL-	1UJ ug/1					
Butylbenzene	1UJ ug/1					
4-Chlorotoluene	1UJ ug/1					
1,4-Dichlorobenzene	1UJ ug/1					
1,2-Dibromoethane (EDB)	1UJ ug/1					
1,2-Dichloroethane	1UJ ug/1					
4-Methyl-2-Pentanone (M+	1UJ ug/1					
1,3,5-Trimethylbenzene	1UJ ug/1					

(Sample Complete)

11-FEB-93
14:12:33

Washington State Department of Ecology
Sample/Project Analysis Results

Project : DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 498086

Description: MW-31

Begin Date: 92/12/02

+ VOA - PP Scan (GCMS)	Water-Totals	Result	Units	+ VOA - PP Scan (GCMS)	Water-Totals	Result	Units
Carbon Tetrachloride	10J	ug/1		Bromobenzene	10J	ug/1	
Acetone	20J	ug/1		Toluene	10J	ug/1	
Chloroform	10J	ug/1		Chlorobenzene	10J	ug/1	
Benzene	10J	ug/1		1,2,4-Trichlorobenzene	10J	ug/1	
1,1,1-Trichloroethane	10J	ug/1		Dibromochloromethane	10J	ug/1	
Bromomethane	10J	ug/1		Tetrachloroethene	0.5J*	ug/1	
Chloromethane	10J	ug/1		Sec-Butylbenzene	10J	ug/1	
Dibromoethane	10J	ug/1		1,3-Dichloropropane	10J	ug/1	
Bromodichloromethane	10J	ug/1		Cis-1,2-Dichloroethane	0.9J*	ug/1	
Chloroethane	10J	ug/1		trans-1,2-Dichloroethane	10J	ug/1	
Vinyl Chloride	10J	ug/1		Fluorobenzene	99 *	ug/1	
Methylene Chloride	50J	ug/1		1,3-Dichlorobenzene	10J	ug/1	
Carbon Disulfide	50J	ug/1		1,1-Dichloropropane	10J	ug/1	
Bromoform	10J	ug/1		2-Hexanone	10J	ug/1	
Bromodichloromethane	10J	ug/1		2,2-Dichloropropane	10J	ug/1	
1,1-Dichloroethane	10J	ug/1		Ethane, 1,1,1,2-Tetrac+	10J	ug/1	
1,1-Dichloroethene	10J	ug/1		Total Xylenes	10J	ug/1	
Trichlorofluoromethane	10J	ug/1		cis-1,3-Dichloropropene	10J	ug/1	
Methane, Dichlorodiflu-	10J	ug/1		trans-1,3-Dichloroprop-	10J	ug/1	
1,2-Dichloropropane	10J	ug/1		p-Bromofluorobenzene	87	& Recov	
2-Butanone	50J	ug/1		D4-1,2-Dichlorobenzene	117	& Recov	
1,1,2-Trichloroethane	10J	ug/1		d8-Toluene	102	& Recov	
Ethene, trichloro-	10J	ug/1		d4-1,2-Dichloroethane	97	& Recov	
ETHANE, 1,1,2,2-TETRAC+	10J	ug/1					
1,2,3-Trichlorobenzene	10J	ug/1					
Hexachlorobutadiene	10J	ug/1					
Naphthalene	10J	ug/1					
2-Chlorotoluene	10J	ug/1					
1,2-Dichlorobenzene	10J	ug/1					
1,2,4-Trimethylbenzene	10J	ug/1					
1,2-Dibromo-3-chloropro-	50J	ug/1					
1,2,3-Trichloropropane	10J	ug/1					
Tert-Butylbenzene	10J	ug/1					
Isopropylbenzene (Cumene)	10J	ug/1					
p-Isopropyltoluene	10J	ug/1					
Ethylbenzene	10J	ug/1					
BENZENE, ETHENYL- (STYR+)	10J	ug/1					
BENZENE, PROPYL-	10J	ug/1					
Butylbenzene	10J	ug/1					
4-Chlorotoluene	10J	ug/1					
1,4-Dichlorobenzene	10J	ug/1					
1,2-Dibromoethane (EDB)	10J	ug/1					
1,2-Dichloroethane	10J	ug/1					
4-Methyl-2-Pentanone (M+	10J	ug/1					
1,3,5-Trimethylbenzene	10J	ug/1					

Source: Well (Test/Observation)

Officer: PZM

Account: D3P11

(Sample Complete)

Project: DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Officer: PZM Account: D3P11

Sample No: 92 498087 Description: MW-21

Begin Date: 9/2/12/02

VOA - PP Scan (GCMS)	Water-Total Result	Units	VOA - PP Scan (GCMS)			Water-Total Result	Units	VOA - PP Scan (GCMS)	Water-Total Result	Units
			*** Continued	Matrix Spike #1	Result					
Carbon Tetrachloride	1UJ	ug/1	Bromobenzene	1UJ	ug/1	1,1-Dichloroethene	75J	Recov		
Acetone	2UJ	ug/1	Toluene	1UJ	ug/1	Trichlorofluoromethane	98J	Recov		
Chloroform	1UJ	ug/1	Chlorobenzene	1UJ	ug/1	Methane, Dichlorodiflu+	96J	Recov		
Benzene	1UJ	ug/1	1,2,4-Trichlorobenzene	1UJ	ug/1	1,2-Dichloropropane	114	Recov		
1,1,1-Trichloroethane	1UJ	ug/1	Dibromochloromethane	1UJ	ug/1	2-Butanone	123J	Recov		
Bromomethane	1UJ	ug/1	Tetrachloroethene	2*	ug/1	1,1,2-Trichloroethane	94	Recov		
Chloromethane	1UJ	ug/1	Sec-Butylbenzene	1UJ	ug/1	Ethene, trichloro-	114	Recov		
Dibromomethane	1UJ	ug/1	1,3-Dichloropropane	1UJ	ug/1	ETHANE, 1,1,2-TETRAC+	94	Recov		
Bromoform	1UJ	ug/1	Cis-1,2-Dichloroethene	0.3J*	ug/1	1,2,3-Trichlorobutadiene	94	Recov		
Bromochloromethane	1UJ	ug/1	trans-1,2-Dichloroethene	1UJ	ug/1	Hexachlorobutadiene	100	Recov		
Chloroethane	1UJ	ug/1	Fluorobenzene	96*	ug/1	Naphthalene	92J	Recov		
Vinyl Chloride	5UJ	ug/1	1,3-Dichlorobenzene	1UJ	ug/1	2-Chlorotoluene	110	Recov		
Methylene Chloride	5UJ	ug/1	1,1-Dichloropropane	1UJ	ug/1	2-Dichlorobenzene	104	Recov		
Carbon Disulfide	1UJ	ug/1	2-Hexanone	1UJ	ug/1	1,2,4-Trimethylbenzene	100	Recov		
Bromoform	1UJ	ug/1	2,2-Dichloropropane	1UJ	ug/1	1,2-Dibromo-3-chloroprop+	114J	Recov		
Bromodichloromethane	1UJ	ug/1	Ethane, 1,1,1,2-Tetrac+	1UJ	ug/1	1,2,3-Trichloropropane	118	Recov		
1,1-Dichloroethane	1UJ	ug/1	Total Xylenes	1UJ	ug/1	Tert-Butylbenzene	90	Recov		
Trichlorofluoromethane	1UJ	ug/1	cis-1,3-Dichloropropene	1UJ	ug/1	Isopropylbenzene, (Cume+)	106	Recov		
Methane, Dichlorodiflu+	5UJ	ug/1	trans-1,3-Dichloroprop+	1UJ	ug/1	p-Isopropyltoluene	96	Recov		
1,2-Dichloropropane	1UJ	ug/1	p-Bromofluorobenzene	98	* Recov	Ethylbenzene	95	Recov		
2-Butanone	5UJ	ug/1	D4-1,2-Dichlorobenzene	119	* Recov	BENZENE, ETHENYL-(STYR+	84	Recov		
1,1,2-Trichloroethane	1UJ	ug/1	d8-Toluene	102	* Recov	BENZENE, PROPYL-	104	Recov		
Ethene, trichloro-	0.2J*	ug/1	d4-1,2-Dichloroethane	98	* Recov	Butylbenzene	92	Recov		
ETHANE, 1,1,2,2-TETRAC+	1UJ	ug/1				4-Chlorotoluene	107	Recov		
1,2,3-Trichlorobenzene	1UJ	ug/1				1,4-Dichlorobenzene	102	Recov		
Hexachlorobutadiene	1UJ	ug/1				1,2-Dibromoethane (EDB)	97	Recov		
Naphthalene	1UJ	ug/1				1,2-Dichloroethane	101	Recov		
2-Chlorotoluene	1UJ	ug/1				4-Methyl-2-Pentanone (M+	120	Recov		
1,2-Dichlorobenzene	1UJ	ug/1				1,3,5-Trimethylbenzene	101	Recov		
1,2,4-Trimethylbenzene	1UJ	ug/1				Bromobenzene	114	Recov		
Ethylobenzene	5UJ	ug/1				Tetraethylbenzene	106J	Recov		
BENZENE, ETHENYL-(STYR+	1UJ	ug/1				Sec-Butylbenzene	100	Recov		
BENZENE, PROPYL-	1UJ	ug/1				Chlorobenzene	98	Recov		
Butylbenzene	1UJ	ug/1				1,2,4-Trichlorobenzene	94	Recov		
4-Chlorotoluene	1UJ	ug/1				Dibromochloromethane	101J	Recov		
1,2-Dibromo-3-chlorop+	1UJ	ug/1				Bromomethane	92	Recov		
1,2,3-Trichloropropane	1UJ	ug/1				Chloroform	103	Recov		
Tert-Butylbenzene	1UJ	ug/1				1,2-Dichloroethene	110	Recov		
Isopropylbenzene (Cume+)	1UJ	ug/1				1,3-Dichloropropane	116	Recov		
p-Isopropyltoluene	1UJ	ug/1				Cis-1,2-Dichloroethene	116	Recov		
Ethylobenzene	1UJ	ug/1				trans-1,2-Dichloroethene	91J	Recov		
BENZENE, ETHENYL-(STYR+	1UJ	ug/1				Fluorobenzene	92J	Recov		
BENZENE, PROPYL-	1UJ	ug/1				1,3-Dichlorobenzene	108J	Recov		
Butylbenzene	1UJ	ug/1				1,4-Dichlorobenzene	108	Recov		
4-Chlorotoluene	1UJ	ug/1				1,2-Dichloroethane	45J	Recov		
1,4-Dichlorobenzene	1UJ	ug/1				Vinyl Chloride	82J	Recov		
1,2-Dibromoethane (EDB)	1UJ	ug/1				Methylene Chloride	92J	Recov		
1,2-Dichloroethane	1UJ	ug/1				Carbon Disulfide	78J	Recov		
Bromoform	1UJ	ug/1				Bromoform	124	Recov		
Bromodichloromethane	1UJ	ug/1				2-Hexanone	108	Recov		
1,3,5-Trimethylbenzene	1UJ	ug/1				2,2-Dichloropropane	98	Recov		
							48J	Recov		

(Continued on next page)

Project: DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 498087

Description: MW-21

Begin Date: 9/2/12/02 :

VOA - PP Scan (GCMS)		Water-Total		VOA - PP Scan (GCMS)		Water-Total	
Matrix Spike #1		Result		Matrix Spike #2		Result	
Ethane	1,1,1,2-Tetrac+	98	% Recov	1,2,3-Trichloropropane	116	% Recov	
Total Xylenes		88	% Recov	Tert-Butylbenzene	92	% Recov	
D4-1,2-Dichlorobenzene		107	% Recov	Isopropylbenzene (Cumene)	108	% Recov	
d8-Toluene		103	% Recov	p-Isopropyltoluene	95	% Recov	
cis-1,3-Dichloropropene		105	% Recov	Ethylbenzene	98	% Recov	
trans-1,3-Dichloropropene		96	% Recov	BENZENE, ETHENYL-(STYR+)	86	% Recov	
d4-1,2-Dichloroethane		101	% Recov	BENZENE, PROPYL-	105	% Recov	
p-Bromofluorobenzene		97	% Recov	Butylbenzene	94	% Recov	
				4-Chlorotoluene	108	% Recov	
				1,4-Dichlorobenzene	105	% Recov	
				1,2-Dibromoethane (EDB)	96	% Recov	
VOA - PP Scan (GCMS)	Matrix Spike #2	Water-Total	Result	1,2-Dichloroethane	106	% Recov	
		Result	Units	4-Methyl-2-Pentanone (M+	115	% Recov	
Carbon Tetrachloride		112J	% Recov	1,3,5-Trimethylbenzene	96	% Recov	
Acetone		79J	% Recov	Bromobenzene	115	% Recov	
Chloroform		105	% Recov	Toluene	100	% Recov	
Benzene		108	% Recov	Chlorobenzene	104	% Recov	
1,1,1-Trichloroethane		116	% Recov	1,2,4-Trichlorobenzene	100	% Recov	
Bromomethane		96J	% Recov	Dibromochloromethane	99J	% Recov	
Chloromethane		98	% Recov	Tetrachloroethene	102J	% Recov	
Dibromomethane		106	% Recov	Sec-Butylbenzene	98	% Recov	
Bromoform		102	% Recov	1,3-Dichloropropene	104	% Recov	
1,1-Dichloroethane		114J	% Recov	Cis-1,2-Dichloroethene	44J	% Recov	
Chloroform		92J	% Recov	trans-1,2-Dichloroethene	94J	% Recov	
Vinyl Chloride		101J	% Recov	Fluorobenzene	100	% Recov	
Methylene Chloride		79J	% Recov	1,3-Dichlorobenzene	103	% Recov	
Carbon Disulfide		122	% Recov	1,1-Dichloropropene	106	% Recov	
Bromoform		112	% Recov	2-Hexanone	96	% Recov	
Bromodichloromethane		100J	% Recov	2,2-Dichloropropene	48J	% Recov	
1,1-Dichloroethene		82J	% Recov	Ethane, 1,1,1,2-Tetrac+	101	% Recov	
1,1-Dichlorofluoromethane		100J	% Recov	Total Xylenes	88	% Recov	
Methane, Dichlorodiflu-		101J	% Recov	D4-1,2-Dichlorobenzene	107	% Recov	
1,2-Dichloropropane		104	% Recov	d8-Toluene	101	% Recov	
2-Butanone		132	% Recov	cis-1,3-Dichloropropene	104	% Recov	
1,1,2-Trichloroethane		102	% Recov	trans-1,3-Dichloroprop-	90	% Recov	
Ethane, trichloro-		114	% Recov	d4-1,2-Dichloroethane	99	% Recov	
ETHANE, 1,1,2,2-TETRAC+		92	% Recov	p-Bromofluorobenzene	95	% Recov	
1,2,3-Trichlorobenzene		99	% Recov				
Hexachlorobutadiene		108	% Recov				
Naphthalene		95J	% Recov				
2-Chlorotoluene		108	% Recov				
1,2-Dichlorobenzene		103	% Recov				
1,2,4-Trimethylbenzene		100	% Recov				
1,2-Dibromo-3-chloropr-		100J	% Recov				

(Sample Complete)

Officer: PZM Account: D3P11

Source: Well (Test/Observation)

Project : DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 498088

Description: MW-16A

Begin Date: 92/12/03 :

	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
Carbon Tetrachloride	1UJ	ug/1						
Acetone	4UJ	ug/1	Bromobenzene			1UJ	ug/1	
Chloroform	1UJ	ug/1	Toluene			1UJ	ug/1	
Benzene	1UJ	ug/1	Chlorobenzene			1UJ	ug/1	
1,1,1-Trichloroethane	1UJ	ug/1	1,2,4-Trichlorobenzene			1UJ	ug/1	
Bromomethane	1UJ	ug/1	Dibromochloromethane			1UJ	ug/1	
Chloromethane	1UJ	ug/1	Tetrachloroethene			9 *	ug/1	
Dibromomethane	1UJ	ug/1	sec-Butylbenzene			1UJ	ug/1	
Bromoform	1UJ	ug/1	1,3-Dichloropropane			1UJ	ug/1	
Chloroethane	1UJ	ug/1	Cis-1,2-Dichloroethene		0.8U *	ug/1		
Vinyl Chloride	1UJ	ug/1	trans-1,2-Dichloroethene			1UJ	ug/1	
Methylene Chloride	5UJ	ug/1	Fluorobenzene			98 *	ug/1	
Carbon Disulfide	5UJ	ug/1	1,3-Dichlorobenzene			1UJ	ug/1	
Bromoform	1UJ	ug/1	1,1-Dichloropropene			1UJ	ug/1	
Bromodichloromethane	1UJ	ug/1	2-Hexanone			1UJ	ug/1	
1,1-Dichloroethane	1UJ	ug/1	2,2-Dichloropropane			1UJ	ug/1	
1,1-Dichloroethene	1UJ	ug/1	Ethane, 1,1,1,2-Tetrac+			1UJ	ug/1	
Trichlorofluoromethane	1UJ	ug/1	Total Xylenes			1UJ	ug/1	
Methane, Dichlorodiflu+	5UJ	ug/1	cis-1,3-Dichloropropene			1UJ	ug/1	
1,2-Dichloropropane	1UJ	ug/1	trans-1,3-Dichloroprop+			1UJ	ug/1	
2-Butanone	5UJ	ug/1	p-Bromofluorobenzene			86	% Recov	
1,1,2-Trichloroethane	1UJ	ug/1	D4-1,2-Dichlorobenzene			121	% Recov	
Ethene, trichloro-	0.3UJ*	ug/1	d8-Toluene			101	% Recov	
Ethane, 1,1,2,2-TETRAC+	1UJ	ug/1	d4-1,2-Dichloroethane		102	% Recov		
1,2,3-Trichlorobenzene	1UJ	ug/1						
Hexachlorobutadiene	1UJ	ug/1						
Naphthalene	1UJ	ug/1						
2-Chlorotoluene	1UJ	ug/1						
1,2-Dichlorobenzene	1UJ	ug/1						
1,2,4-Trimethylbenzene	1UJ	ug/1						
1,2-Dibromo-3-chloropr+	5UJ	ug/1						
1,2,3-Trichloropropane	1UJ	ug/1						
Tert-Butylbenzene	1UJ	ug/1						
Isopropylbenzene (Cume+)	1UJ	ug/1						
p-Isopropyltoluene	1UJ	ug/1						
Ethylbenzene	1UJ	ug/1						
BENZENE, ETHENYL-(STYR+	1UJ	ug/1						
BENZENE, PROPYL-	1UJ	ug/1						
Butylbenzene	1UJ	ug/1						
4-Chlorotoluene	1UJ	ug/1						
1,4-Dichlorobenzene	1UJ	ug/1						
1,2-Dibromoethane (EDB)	1UJ	ug/1						
1,2-Dichloroethane	1UJ	ug/1						
4-Methyl-2-Pentanone (M+	1UJ	ug/1						
1,3,5-Trimethylbenzene	1UJ	ug/1						

Source: Well (Test/Observation)

Officer: PZM Account: D3P11

(Sample Complete)

Project : DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 498089

Description: MW-16B

Begin Date: 92/12/03 :

Source: Well (Test/Observation)

Officer: P2M

Account: D3P11

	VOA - PP Scan (GCMS)	Water-Totals	Result	Units	VOA - PP Scan (GCMS)	Water-Totals	Result	Units	
		Result	Units		**	Continued	**	Result	Units
Carbon Tetrachloride		1UJ	ug/l						
Acetone		2UJ	ug/l		Bromobenzene		1UJ	ug/l	
Chloroform		1UJ	ug/l		Toluene		1UJ	ug/l	
Benzene		1UJ	ug/l		Chlorobenzene		1UJ	ug/l	
1,1,1-Trichloroethane		1UJ	ug/l		1,2,4-Trichlorobenzene		1UJ	ug/l	
Bromomethane		1UJ	ug/l		Dibromochloromethane		1UJ	ug/l	
Bromochloroethane		1UJ	ug/l		Tetrachloroethene		1UJ	ug/l	
Chloroethane		1UJ	ug/l		Sec-Butylbenzene		1UJ	ug/l	
Vinyl Chloride		1UJ	ug/l		1,3-Dichloropropane		1UJ	ug/l	
Methylene Chloride		5UJ	ug/l		Cis-1,2-Dichloroethene	0.8J*	ug/l		
Carbon Disulfide		5UJ	ug/l		trans-1,2-Dichloroethene+		1UJ	ug/l	
Bromoform		1UJ	ug/l		Fluorobenzene	98 *	ug/l		
Bromodichloromethane		1UJ	ug/l		1,3-Dichlorobenzene		1UJ	ug/l	
1,1-Dichloroethane		1UJ	ug/l		1,1-Dichloropropane		1UJ	ug/l	
1,1-Dichloroethene		1UJ	ug/l		2-Hexanone		1UJ	ug/l	
Trichlorofluoromethane		1UJ	ug/l		2,2-Dichloropropane		1UJ	ug/l	
Methane, Dichlorodiflu-		5UJ	ug/l		Ethane, 1,1,1,2-Tetrac+		1UJ	ug/l	
1,2-Dichloropropane		1UJ	ug/l		Total Xylenes		1UJ	ug/l	
2-Butanone		5UJ	ug/l		cis-1,3-Dichloropropene		1UJ	ug/l	
1,1,2-Trichloroethane		1UJ	ug/l		trans-1,3-Dichloroprop-		1UJ	ug/l	
Ethane, trichloro-	0.4J*	ug/l		p-Bromofluorobenzene	90	% Recov			
ETHANE, 1,1,2,2-TETRAC+		1UJ	ug/l		D4-1,2-Dichlorobenzene	115	% Recov		
1,2,3-Trichlorobenzene		1UJ	ug/l		d8-Toluene	101	% Recov		
Hexachlorobutadiene		1UJ	ug/l		d4-1,2-Dichloroethane	100	% Recov		
Naphthalene		1UJ	ug/l						
2-Chlorotoluene		1UJ	ug/l						
1,2-Dichlorobenzene		1UJ	ug/l						
1,2,4-Trimethylbenzene		1UJ	ug/l						
1,2-Dibromo-3-chloropr-		5UJ	ug/l						
1,2,3-Trichloropropane		1UJ	ug/l						
Tert-Butylbenzene		1UJ	ug/l						
Isopropylbenzene (Cum+		1UJ	ug/l						
p-Isopropyltoluene		1UJ	ug/l						
Ethylibenzene		1UJ	ug/l						
BENZENE, ETHENYL-(STYR+		1UJ	ug/l						
BENZENE, PROPYL-		1UJ	ug/l						
Butylbenzene		1UJ	ug/l						
4-Chlorotoluene		1UJ	ug/l						
1,4-Dichlorobenzene		1UJ	ug/l						
1,2-Dibromoethane (EDB)		1UJ	ug/l						
1,2-Dichloroethane		1UJ	ug/l						
4-Methyl-2-Pentanone (M+		1UJ	ug/l						
1,3,5-Trimethylbenzene		1UJ	ug/l						

(Sample Complete)

11-FEB-93
14:12:33

Washington State Department of Ecology
Sample/Project Analysis Results

Project: DOE-553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 498090 Description: MW-20B

Begin Date: 92/12/03 :

+-----+ <th>VOA - PP Scan (GCMS)</th> <th>Water-Totals</th> <th>+-----+</th>	VOA - PP Scan (GCMS)	Water-Totals	+-----+
	*** Continued ***		
Duplicate #1	Result	Units	
+-----+	+-----+	+-----+	+-----+
Ethane	1,1,1,2-Tetrac+	NAR	ug/l
Total Xylenes		NAR	ug/l
cis-1,3-Dichloropropene		NAR	ug/l
trans-1,3-Dichloropropene		NAR	ug/l
p-Bromofluorobenzene	8.7	t Recov	
D4-1,2-Dichlorobenzene	113	t Recov	
d8-Toluene	100	t Recov	
d4-1,2-Dichloroethane	99	t Recov	

Source: Well (Test/observation)

Officer: PZM Account: D3P11

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(Sample Complete)

Project : DOE-553Y LAKWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No.: 92 498091

Description: MW-20A**

Begin Date: 9/2/12/02

	VOA - PP Scan (GCMS)	Water-Total Result Units	VOA - PP Scan (GCMS) Result Units	Water-Total Result Units
Carbon Tetrachloride	1UJ ug/1	Bromobenzene	1UJ ug/1	
Acetone	2UJ ug/1	Toluene	1UJ ug/1	
Chloroform	1UJ ug/1	Chlorobenzene	1UJ ug/1	
Benzene	1UJ ug/1	1,2,4-Trichlorobenzene	1UJ ug/1	
1,1,1-Trichloroethane	1UJ ug/1	Dibromochloromethane	1UJ ug/1	
Bromomethane	1UJ ug/1	Tetrachloroethene	0.3J ug/1	
Chloromethane	1UJ ug/1	Sec-Butylbenzene	1UJ ug/1	
Dibromochloromethane	1UJ ug/1	1,3-Dichloropropane	1UJ ug/1	
Bromochloromethane	1UJ ug/1	Cis-1,2-Dichloroethene	1UJ ug/1	
Chloroethane	1UJ ug/1	trans-1,2-Dichloroethene+	1UJ ug/1	
Vinyl Chloride	1UJ ug/1	Fluorobenzene	9.6 ug/1	
Methylene Chloride	5UJ ug/1	1,3-Dichlorobenzene	1UJ ug/1	
Carbon Disulfide	1UJ ug/1	1,1-Dichloropropane	1UJ ug/1	
Bromoform	1UJ ug/1	2-Hexanone	1UJ ug/1	
Bromodichloromethane	1UJ ug/1	2,2-Dichloropropane	1UJ ug/1	
1,1-Dichloroethane	1UJ ug/1	Ethane, 1,1,2-Tetrac+	1UJ ug/1	
1,1-Dichloroethene	1UJ ug/1	Total Xylenes	1UJ ug/1	
Trichlorofluoromethane	1UJ ug/1	cis-1,3-Dichloropropene	1UJ ug/1	
Methane, Dichlorodiflu+	5UJ ug/1	trans-1,3-Dichloroprop+	1UJ ug/1	
1,2-Dichloropropane	1UJ ug/1	2-P-Bromofluorobenzene	8.6 ug/1	Recov
2-Butanone	5UJ ug/1	D4-1,2-Dichlorobenzene	11.7 ug/1	Recov
1,1,2-Trichloroethane	1UJ ug/1	d8-Toluene	10.1 ug/1	Recov
Ethene, trichloro-	1UJ ug/1	d4-1,2-Dichloroethane	100 ug/1	Recov
ETHANE, 1,1,2,2-TETRAC+	1UJ ug/1			
1,2,3-Trichlorobenzene	1UJ ug/1			
Hexachlorobutadiene	1UJ ug/1			
Naphthalene	1UJ ug/1			
2-Chlorotoluene	1UJ ug/1			
1,2-Dichlorobenzene	1UJ ug/1			
1,2,4-Trimethylbenzene	1UJ ug/1			
1,2-Dibromo-3-chloropr+	5UJ ug/1			
1,2,3-Trichloropropane	1UJ ug/1			
Tert-Butylbenzene	1UJ ug/1			
Isopropylbenzene (Cume+)	1UJ ug/1			
p-Isopropyltoluene	1UJ ug/1			
Ethylbenzene	1UJ ug/1			
BENZENE, ETHENYL- (STYR+)	1UJ ug/1			
BENZENE, PROPYL-	1UJ ug/1			
Butylbenzene	1UJ ug/1			
4-Chlorotoluene	1UJ ug/1			
1,4-Dichlorobenzene	1UJ ug/1			
1,2-Dibromoethane (EDB)	1UJ ug/1			
1,2-Dichloroethane	1UJ ug/1			
4-Methyl-2-Pentanone (M+)	1UJ ug/1			
1,3,5-Trimethylbenzene	1UJ ug/1			

(Sample Complete)

Project: DOE- 553Y LAKEWOOD/PLAZA CLEANERS

Laboratory: Ecology, Manchester

Sample No: 92 498092

Description: TRANSFER

Begin Date: 92/12/02

	VOA - PP Scan (GCMS)	Water-Total Result Units	VOA - PP Scan (GCMS) Result Units	Water-Total Result Units
Carbon Tetrachloride	1UJ ug/1			
Acetone	7UJ ug/1		Bromobenzene	1UJ ug/1
Chloroform	1UJ ug/1		Toluene	1UJ ug/1
Benzene	1UJ ug/1		Chlorobenzene	1UJ ug/1
1,1,1-Trichloroethane	1UJ ug/1		1,2,4-Trichlorobenzene	1UJ ug/1
Bromomethane	1UJ ug/1		Dibromo-chloromethane	1UJ ug/1
Bromochloromethane	1UJ ug/1		Tetrachloroethene	1UJ ug/1
Chloromethane	1UJ ug/1		Sec-Butylbenzene	1UJ ug/1
Dibromochloromethane	1UJ ug/1		1,3-Dichloropropane	1UJ ug/1
Chloroethane	1UJ ug/1		Cis-1,2-Dichloroethene	1UJ ug/1
Vinyl Chloride	1UJ ug/1		trans-1,2-Dichloroethene	1UJ ug/1
Methylene Chloride	1UJ ug/1		Fluorobenzene	97 * ug/1
Carbon Disulfide	5UJ ug/1		1,3-Dichlorobenzene	1UJ ug/1
Bromoform	1UJ ug/1		1,1-Dichloropropene	1UJ ug/1
Bromodichloromethane	1UJ ug/1		2-Hexanone	1UJ ug/1
1,1-Dichloroethane	1UJ ug/1		2,2-Dichloropropane	1UJ ug/1
1,1-Dichloroethene	1UJ ug/1		Ethane, 1,1,1,2-Tetrac+	1UJ ug/1
Trichlorofluoromethane	1UJ ug/1		Total Xylenes	1UJ ug/1
Methane, Dichlorodiflu+	5UJ ug/1		cis-1,3-Dichloropropene	1UJ ug/1
1,2-Dichloropropane	1UJ ug/1		trans-1,3-Dichloroprop+	1UJ ug/1
2-Butanone	5UJ ug/1		p-Bromo-fluorobenzene	89 * Recov
1,1,2-Trichloroethane	1UJ ug/1		D4-1,2-Dichlorobenzene	115 * Recov
Ethene, trichloro-	1UJ ug/1		d8-Toluene	100 * Recov
ETHANE, 1,1,2,2-TETRAC+	1UJ ug/1		d4-1,2-Dichloroethane	97 * Recov
1,2,3-Trichlorobenzene	1UJ ug/1			
Hexachlorobutadiene	1UJ ug/1			
Naphthalene	1UJ ug/1			
2-Chlorotoluene	1UJ ug/1			
1,2,4-Trimethylbenzene	1UJ ug/1			
1,2-Dibromo-3-chloropr	5UJ ug/1			
1,2,3-Trichloropropane	1UJ ug/1			
Tert-Butylbenzene	1UJ ug/1			
Isopropylbenzene (Cum+	1UJ ug/1			
p-Isopropyltoluene	1UJ ug/1			
Ethylibenzene	1UJ ug/1			
BENZENE, ETHENYL-(STYR+ BENZENE, PROPYL-	1UJ ug/1			
Butylbenzene	1UJ ug/1			
4-Chlorobenzene	1UJ ug/1			
1,4-Dichlorobenzene	1UJ ug/1			
1,2-Dibromoethane (EDB)	1UJ ug/1			
1,2-Dichloroethane	1UJ ug/1			
4-Methyl-2-Pentanone (M+	1UJ ug/1			
1,3,5-Trimethylbenzene	1UJ ug/1			

(Sample Complete)

Officer: PZM

Account: D3P11

Project: DOE-553Y LAKEWOOD/PLAZA CLEANERS

Officer: PZM Account: D3P11

Laboratory: Ecology, Manchester

Sample No: 92 498093 Description: TRNASPOR

Begin Date: 92/12/02 :

	VOA - PP Scan (GCMS)	Water-Totals	VOA - PP Scan (GCMS)	Water-Totals	Result	Units	Result	Units
		Result Units		*** Continued ***				
Carbon Tetrachloride		1UJ ug/1						
Acetone	3UJ ug/1		Bromobenzene	1UJ ug/1				
Chloroform	1UJ ug/1		Toluene	1UJ ug/1				
Benzene	1UJ ug/1		Chlorobenzene	1UJ ug/1				
1,1,1-Trichloroethane	1UJ ug/1		1,2,4-Trichlorobenzene	1UJ ug/1				
Bromomethane	1UJ ug/1		Dibromochloromethane	1UJ ug/1				
Chloromethane	1UJ ug/1		Tetrachloroethene	1UJ ug/1				
Dibromoethane	1UJ ug/1		Sec-Butylbenzene	1UJ ug/1				
Bromoethylmethane	1UJ ug/1		1,3-Dichloropropane	1UJ ug/1				
Chloroethane	1UJ ug/1		Cis-1,2-Dichloroethene	1UJ ug/1				
Vinyl Chloride	1UJ ug/1		trans-1,2-Dichloroethene	1UJ ug/1				
Methylene Chloride	1UJ ug/1		Fluorobenzene	97 * ug/1				
Carbon Disulfide	5UJ ug/1		1,3-Dichlorobenzene	1UJ ug/1				
Bromoform	1UJ ug/1		1,1-Dichloropropene	1UJ ug/1				
Bromodichloromethane	1UJ ug/1		2-Hexanone	1UJ ug/1				
1,1-Dichloroethane	1UJ ug/1		2,2-Dichloropropene	1UJ ug/1				
1,1-Dichloroethene	1UJ ug/1		Ethane, 1,1,1,2-Tetrac+	1UJ ug/1				
Trichlorofluoromethane	1UJ ug/1		Total Xylenes	1UJ ug/1				
Methane, Dichlorodiflu-	5UJ ug/1		cis-1,3-Dichloropropene	1UJ ug/1				
1,2-Dichloropropane	1UJ ug/1		trans-1,3-Dichloropropene	1UJ ug/1				
2-Butanone	5UJ ug/1		p-Bromofluorobenzene	91 % Recov				
1,1,2-Trichloroethane	1UJ ug/1		D4-1,2-Dichlorobenzene	119 % Recov				
Ethene, trichloro-	1UJ ug/1		d8-Toluene	101 % Recov				
ETHANE, 1,1,2,2-TETRAC+	1UJ ug/1		d4-1,2-Dichloroethane	97 % Recov				
1,2,3-Trichlorobutadiene	1UJ ug/1		Naphthalene	1UJ ug/1				
Hexachlorobutadiene	1UJ ug/1		2-Chlorotoluene	1UJ ug/1				
			1,2-Dichlorobenzene	1UJ ug/1				
			1,2,4-Trimethylbenzene	1UJ ug/1				
			1,2-Dibromo-3-chloropr+	5UJ ug/1				
			1,2,3-Trichloropropane	1UJ ug/1				
			Tert-Butylbenzene	1UJ ug/1				
			Isopropylbenzene (Cumene)	1UJ ug/1				
			P-Isopropyltoluene	1UJ ug/1				
			Ethylbenzene	1UJ ug/1				
			BENZENE, ETHENYL-(STYR+)	1UJ ug/1				
			BENZENE, PROPYL-	1UJ ug/1				
			Butylbenzene	1UJ ug/1				
			4-Chlorotoluene	1UJ ug/1				
			1,4-Dichlorobenzene	1UJ ug/1				
			1,2-Dibromoethane (EDB)	1UJ ug/1				
			1,2-Dichloroethane	1UJ ug/1				
			4-Methyl-2-Pentanone (M+	1UJ ug/1				
			1,3,5-Trimethylbenzene	1UJ ug/1				

(Sample Complete)

Project: DOE-553Y LAKEWOOD/PLAZA CLEANERS

Blank ID: BW2356

Account: D3P11

	VOA - PP Scan (GCMS)	Water-Total	VOA - PP Scan (GCMS)	Water-Total	
Blank #1	Result	Units	Blank #1	Result	Units
Carbon Tetrachloride	10	ug/1	Bromobenzene	1U	ug/1
Acetone	7 *	ug/1	Toluene	0.2J*	ug/1
Chloroform	1U	ug/1	Chlorobenzene	1U	ug/1
Benzene	1U	ug/1	1,2,4-Trichlorobenzene	0.4J*	ug/1
1,1,1-Trichloroethane	1U	ug/1	Dibromo-chloromethane	1U	ug/1
Bromomethane	1U	ug/1	Tetra-chloroethene	1U	ug/1
Chloromethane	1U	ug/1	Sec-Butylbenzene	1U	ug/1
Dibromomethane	1U	ug/1	1,3-Dichloropropane	1U	ug/1
Bromo-chloromethane	1U	ug/1	Cis-1,2-Dichloroethene	1U	ug/1
Chloroethane	1U	ug/1	trans-1,2-Dichloroethene+	1U	ug/1
Vinyl Chloride	1U	ug/1	Fluorobenzene	97 *	ug/1
Methylene Chloride	0.4J*	ug/1	1,3-Dichlorobenzene	1U	ug/1
Carbon Disulfide	5U	ug/1	1,1-Dichloropropene	1U	ug/1
Bromoform	1U	ug/1	2-Hexanone	1U	ug/1
Bromodichloromethane	1U	ug/1	2,2-Dichloropropane	1U	ug/1
1,1-Dichloroethane	1UJ	ug/1	Ethane, 1,1,1,2-TETRAC+	1U	ug/1
1,1-Dichloroethene	1UJ	ug/1	Total Xylenes	0.3J*	ug/1
Trichlorofluoromethane	1U	ug/1	cis-1,3-Dichloropropene	1U	ug/1
Methane, Dichlorofluoromethane	5U	ug/1	trans-1,3-Dichloropropene	1U	ug/1
1,2-Dichloropropane	1U	ug/1	p-Bromofluorobenzene	85	% Recov
2-Butanone	2J*	ug/1	D4-1,2-Dichlorobenzene	109	% Recov
1,1,2-Trichloroethane	1U	ug/1	d8-Toluene	106	% Recov
Ethene, trichloro-Ethane,	1U	ug/1	d4-1,2-Dichloroethane	104	% Recov
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1			
1,2,3-Trichlorobenzene	0.5J*	ug/1			
Hexachlorobutadiene	1UJ	ug/1			
Naphthalene	0.6J*	ug/1			
2-Chlorotoluene	1U	ug/1			
1,2-Dichlorobenzene	1U	ug/1			
1,2,4-Trimethylbenzene	1U	ug/1			
1,2-Dibromo-3-chloropropane	5UJ	ug/1			
1,2,3-Trichloropropane	1U	ug/1			
Tert-Butylbenzene	1U	ug/1			
Isopropylbenzene (Cume+)	0.2J*	ug/1			
P-Isopropyltoluene	1U	ug/1			
Ethylbenzene	0.2J*	ug/1			
BENZENE, ETHENYL- (STYR+)	1U	ug/1			
BENZENE, PROPYL-	1U	ug/1			
Butylbenzene	1U	ug/1			
4-Chlorotoluene	1U	ug/1			
1,4-Dichlorobenzene (EDB)	1UJ	ug/1			
1,2-Dibromoethane	1U	ug/1			
4-Methyl-2-Pentanone (M+)	1U	ug/1			
1,3,5-Trimethylbenzene	1U	ug/1			

(Sample Complete)

11-FEB-93
14:12:33

Washington State Department of Ecology
Sample/Project Analysis Results

Project: DOE-553Y LAKWOOD/PLAZA CLEANERS

Blank ID: BW2357

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Account: D3P11

Officer: PZM

	VOA - PP Scan (GCMS)	Water-Total	VOA - PP Scan (GCMS)	Water-Total	
	Blank #2	Result Units	Blank #2	Result Units	*** Continued ***
Carbon Tetrachloride	1UJ ug/1		Blank		
Acetone	3J*	ug/1	Bromobenzene	1U	ug/1
Chloroform	1U	ug/1	Toluene	0.1UJ*	ug/1
Benzene	1U	ug/1	Chlorobenzene	1U	ug/1
1,1,1-Trichloroethane	1U	ug/1	1,2,4-Trichlorobenzene	1U	ug/1
Bromomethane	1UJ ug/1		Dibromochloromethane	1UJ ug/1	
Chloromethane	1UJ ug/1		Tetrachloroethene	1U	ug/1
Dibromomethane	1UJ ug/1		Sec-Butylbenzene	1U	ug/1
Bromoethylmethane	1U	ug/1	1,3-Dichloropropane	1U	ug/1
Chloroethane	1UJ ug/1		Cis-1,2-Dichloroethene	1U	ug/1
Vinyl Chloride	1UJ ug/1		trans-1,2-Dichloroethene+	1UJ ug/1	
Methylene Chloride	0.4J*	ug/1	Fluorobenzene	97*	ug/1
Carbon Disulfide	5U	ug/1	1,3-Dichlorobenzene	1U	ug/1
Bromoform	1U	ug/1	1,1-Dichloropropene	1U	ug/1
Bromodichloromethane	1U	ug/1	2-Hexanone	1U	ug/1
1,1-Dichloroethane	1UJ ug/1		2,2-Dichloropropane	1UJ ug/1	
1,1-Dichloroethene	1UJ ug/1		Ethane, 1,1,1,2-Tetra-	1U	ug/1
Trichlorofluoromethane	1UJ ug/1		Total Xylenes	1U	ug/1
Methane, Dichlorodiflu-	5U	ug/1	cis-1,3-Dichloropropene	1U	ug/1
1,2-Dichloropropane	1U	ug/1	trans-1,3-Dichloroprop-	1U	ug/1
2-Butanone	2J*	ug/1	p-Bromofluorobenzene	89	% Recov
1,1,2-Trichloroethane	1U	ug/1	D4-1,2-Dichlorobenzene	118	% Recov
Ethene, trichloro-	1U	ug/1	d8-Toluene	102	% Recov
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1	d4-1,2-Dichloroethane	98	% Recov
1,2,3-Trichlorobenzene	1U	ug/1			
Hexachlorobutadiene	1U	ug/1			
Naphthalene	1U	ug/1			
2-Chlorotoluene	1U	ug/1			
1,2-Dichlorobenzene	1U	ug/1			
1,2,4-Trimethylbenzene	1U	ug/1			
1,2-Dibromo-3-chloropr-	5UJ ug/1				
1,2,3-Trichloropropane	1U	ug/1			
Tert-Butylbenzene	1U	ug/1			
Isopropylbenzene (Cume+	1U	ug/1			
p-Isopropyltoluene	1U	ug/1			
Ethylbenzen	1U	ug/1			
BENZENE, ETHENYL- (STYR+	0.1UJ*	ug/1			
BENZENE, PROPYL-	1U	ug/1			
Butylbenzen	1U	ug/1			
4-Chlorotoluene	1U	ug/1			
1,4-Dichlorobenzene	1U	ug/1			
1,2-Dibromoethane (EDB)	1UJ ug/1				
1,2-Dichloroethane	1U	ug/1			
4-Methyl-2-Pentanone (M+	1U	ug/1			
1,3,5-Trimethylbenzene	1U	ug/1			

(Sample Complete)

Project : DOE-553Y LAKEWOOD/PLAZA CLEANERS

Blank ID : BW2358

	VOA - PP Scan (GCMS)	Water-Totals	VOA - PP Scan (GCMS)	Water-Totals
Blank #3	Result	Units	Blank #3	Result
Carbon Tetrachloride	10J	ug/1	Blank #3	*** Continued ***
Acetone	3J*	ug/1	Bromobenzene	10 ug/1
Chloroform	1U	ug/1	Toluene	0.1J* ug/1
Benzene	1U	ug/1	Chlorobenzene	0 ug/1
1,1,1-Trichloroethane	1U	ug/1	1,2,4-Trichlorobenzene	0.3J* ug/1
Bromomethane	1U	ug/1	Dibromoethylmethane	1UJ ug/1
Chloromethane	1U	ug/1	Tetrachloroethene	1UJ ug/1
Dibromomethane	1U	ug/1	Sec-Butylbenzene	1U ug/1
Bromoethylmethane	1U	ug/1	1,3-Dichloropropane	1U ug/1
Bromoethane	1U	ug/1	Cis-1,2-Dichloroethene	1UJ ug/1
Vinyl Chloride	1UJ	ug/1	trans-1,2-Dichloroethene	1UJ ug/1
Methylene Chloride	0.5J*	ug/1	Fluorobenzene	98 * ug/1
Carbon Disulfide	5U	ug/1	1,3-Dichlorobenzene	1U ug/1
Bromoform	1U	ug/1	1,1-Dichloropropene	1U ug/1
Bromodichloromethane	1U	ug/1	2-Hexanone	1U ug/1
1,1-Dichloroethane	1UJ	ug/1	2,2-Dichloropropane	1U ug/1
1,1-Dichloroethene	1UJ	ug/1	Ethane, 1,1,1,2-Tetra-	1U ug/1
Trichlorofluoromethane	1UJ	ug/1	Total Xylenes	1U ug/1
Methane, Dichlorodiflu+	5U	ug/1	cis-1,3-Dichloropropene	1U ug/1
1,2-Dichloropropane	1U	ug/1	trans-1,3-Dichloroprop-	1U ug/1
2-Butanone	5U	ug/1	p-Bromofluorobenzene	90 * Recov
1,1,2-Trichloroethane	1U	ug/1	D4-1,2-Dichlorobenzene	116 * Recov
Ethene, trichloro-	1U	ug/1	d8-Toluene	103 * Recov
ETHANE, 1,1,2,2-TETRAC+	1U	ug/1	d4-1,2-Dichloroethane	95 * Recov
1,2,3-Trichlorobenzene	0.5J*	ug/1		
Hexachlorobutadiene	1U	ug/1		
Naphthalene	1UJ	ug/1		
2-Chlorotoluene	1U	ug/1		
1,2-Dichlorobenzene	1U	ug/1		
1,2,4-Trimethylbenzene	1U	ug/1		
1,2-Dibromo-3-chloropr+	5UJ	ug/1		
1,2,3-Trichloropropane	1U	ug/1		
Tert-Butylbenzene	1U	ug/1		
Isopropylbenzene (Cumene)	1U	ug/1		
p-Isopropyltoluene	1U	ug/1		
Ethylbenzene	1U	ug/1		
BENZENE, ETHENYL-(STYR+)	1U	ug/1		
BENZENE, PROPYL-	1U	ug/1		
Butylbenzene	1U	ug/1		
4-Chlorotoluene	1U	ug/1		
1,4-Dichlorobenzene	1U	ug/1		
1,2-Dibromoethane (EDB)	1U	ug/1		
1,2-Dichloroethane	1U	ug/1		
4-Methyl-2-Pentanone (M+)	1U	ug/1		
1,3,5-Trimethylbenzene	1U	ug/1		

(Sample Complete)

APPENDIX B

Historical TCE and PERC Data

Table B-1
TCE Concentrations Measured in Monitoring Wells
Pender's Corner, Washington

Table B-1
TCE Concentrations Measured in Monitoring Wells
Pawleys Corner, Washington

Well No.	2/12/85 Through 2/14/85	3/12/85		5/16/85		6/17/85		7/25/85		8/20/85		8/23/85 ^a		11/5/85		11/7/85 ^a		12/1/85		12/17/85		3/17/86		3/21/86		3/25/86		3/29/86		10/5/87		10/5/87		10/29/88		10/4/89		5/22/89		5/23/89		Through 5/25/89		Through 4/24/90	
		Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through	Through																	
33	ND	ND	NM	ND	ND	NM	ND	ND	ND	ND	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							
34	ND	ND	NM	NM	NM	ND	ND	ND	ND	ND	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							
35	ND	ND	NM	NM	NM	ND	ND	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM							
36	42	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM																	
37 ^c																																													
38 ^c																																													
39A ^c																																													
39B ^c																																													
39C																																													
40 ^c																																													
41 ^c																																													

^aExceeded acceptable holding time.

^bDuplicate analysis.

^cDetection limit = 100 µg/l.

^dEstimated value. Compound present but at less than the specified detection limit.

^eWells constructed 2/87 through 3/87.

Note: Units in parts per billion.

NM = Not measured.

ND = Not detected.

D = Detected, not quantified.

J = Estimated value. Value not accurate.

Table B-2
PERC Concentration Measured in Meekerting Wells
Ponders Corner, Washington

